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| 09/722,955      | 11/27/2000  | Evan L. Goldstein    | 1999-0797           | 5026             |

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EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/722,955

Applicant(s)

GOLDSTEIN ET AL.

Examiner

M. R. Sedighian

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 44-89 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 44-68 and 75-89 is/are rejected.
- 7) ☒ Claim(s) 69-74 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

1. This communication is responsive to applicant's 5/5/2004 amendments in the application of Evan L. Goldstein et al. for "Wavelength add/drop multiplexer with client configurability" filed 11/27/2000. The amendments have been entered. Claims 44-89 are now pending.

2. Claim 79 is objected because the phrase "back first surface" in lines 3-4, should change to --- back surface ---.

Claim 83 is objected because the phrase "first optical switch array" in lines 13, should change to --- second optical switch array ---.

Correction is required.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 44, 62, 67, 75, 77, 80, 81, 83, 84, and 86 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 44, it recites the limitation "the add channels" in line 7. There is insufficient antecedent basis for this limitation in the claim.

As to claim 62, it is not clear what is meant by "... a selector that selects, for each one of the one or more additional channels ... ". Which device is the selector that selects an optical switch??

As to claims 67 and 80, it is not clear what is meant by "... a tunable add port ...".

Figures 1-4 each shows add ports to transmit the added channels. What does it mean by the

tunable add port?? Furthermore, as to claim 67, it recites the limitation "the input channels" in line 15. There is insufficient antecedent basis for this limitation in the claim.

As to claim 75, it is not clear what is meant by "... and the drop port is coupled to the second array of switches ...". Figures 8-9 does not show the drop port is coupled to the second array of switches.

As to claim 77, it is not clear what is meant by "... an input channel is re-directed to a drop port by a front surface of a first micromirror of the first array of switches and a front surface of the second array of switches ... ". Figure 9 shows the front side 822a of micromirror 822 causes the input channel 811A to be redirected to drop channel 851B. What does it mean by re-directing an input channel to a drop port by a front surface of the second array of switches??

As to claim 81, it recites the limitation "said input and output ports" in line 5. There is insufficient antecedent basis for this limitation in the claim.

As to claim 83, it recites the limitation "said input and output ports" in line 5. There is insufficient antecedent basis for this limitation in the claim.

As to claim 84, it recites the limitation "said front reflective surface" in line 5. There is insufficient antecedent basis for this limitation in the claim.

As to claim 86, it recites the limitation "said input and output ports" in line 7. There is insufficient antecedent basis for this limitation in the claim.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 44-45, 48-52, 54, 57-60, 81, and 88-89 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu (US Patent No: 5,581,643).

Regarding claims 44, 52, 81, and 88-89, Wu teaches a method for adding and dropping channels from an optical transmission medium (col. 4, lines 5-15, 39-48, col. 6, lines 1-2 and fig. 13), comprising: receiving an input signal having at least two input channels (col. 9, lines 49-54 and  $\lambda_1$ ,  $\lambda_2$ , fig. 13); selecting a wavelength (col. 9, line 64 and for example,  $\lambda_{12}$ , fig. 13); generating an add signal ( $\lambda_{12}$ , fig. 13) having at least one add channel at the selected wavelength (col. 9, lines 64-65, note that input signals can be added to the system by the input lines via the columns at the bottom of matrix switch in fig. 13, for example  $\lambda_{12}$  can be considered as the added channel); transmitting the input channels and the add channel through an optical switch matrix (col. 9, lines 53-55, 61-67, col. 10, line 1), the optical switch matrix having one or more switches (col. 9, lines 58-61) that are capable of redirecting the input channels and the add channel as they pass through the switch matrix (col. 9, lines 50-57); and outputting an output signal by configuring (col. 4, lines 10-30) the one or more optical switches of the matrix so that at least one of the input channels is replaced by the at least one add channel at the selected wavelength (note that  $\lambda_1$  is dropped by one of the switching mirror and  $\lambda_{12}$  is added). As to claim 52, Wu further teaches generating add channels at selectable wavelengths (col. 9, line 64-65 and  $\lambda_9$ - $\lambda_{16}$ , fig. 13). Wu further teaches one of the input channels is redirected away from a

corresponding path through the switch matrix and one of the add channels is redirected to that path (for example  $\lambda_1$  is dropped from the first input line of the first row in the left hand side, and  $\lambda_{12}$  is added to the same row, as it is shown in fig. 13). As to claim 81, Wu teaches a plurality of input channels of particular wavelengths (the input channels  $\lambda_1$ - $\lambda_8$ ) and a plurality of add channels (the input channels  $\lambda_9$ - $\lambda_{16}$ ), wherein any of the add channels can be directed to the output ports (note that the added channels  $\lambda_9$ - $\lambda_{16}$  are directed to the output ports in the right hand side of the switch matrix). As to claims 88-89, Wu further teaches an array of micromirrors (col. 9, lines 59-60) that are rotatably (col. 1, lines 60-63) mounted on a substrate (col. 7, lines 18-25 and figs. 4A, 13), characterized in that the mirrors have reflective first and second surfaces (col. 10, line 2).

Regarding claims 45 and 54, Wu teaches each input channel has specific wavelengths ( $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$ ,  $\lambda_4$ ,  $\lambda_5$ ,  $\lambda_6$ ,  $\lambda_7$ ,  $\lambda_8$ , fig. 13).

Regarding claims 48 and 57, Wu teaches the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate (col. 7, lines 15-30 and figs. 4B, 13).

Regarding claims 49 and 58, Wu teaches each micromirror is capable of being in a first state (the "on" state) for redirecting light (col. 9, line 67, col. 10, lines 1-2) passing in close proximity to the micromirror (for example when each mirror is in on state and that reflects the light), and a second state (the "off" state) in which light passing in close proximity to the micromirror is not redirected (when the mirror is in off state light is not redirected).

Regarding claims 50-51 and 59-60, Wu teaches the optical switch matrix is an array of bubble switches (col. 9, lines 49-53). As to claims 51 and 60, it requires similar limitations as discussed in claim 49 above.

7. Claims 44-49 and 52-58 are rejected under 35 U.S.C. 102(e) as being anticipated by Liu (US Patent No: 6,519,060).

Regarding claims 44 and 52, Liu teaches a method for adding and dropping channels from an optical transmission medium (1201, 1203, fig. 9), comprising: receiving an input signal (1201, fig. 9) having at least two input channels ( $\lambda_1 \dots \lambda_4$ , fig. 9); selecting a wavelength (for example the signal  $\lambda_1$  in fig. 9); generating an add signal having at least one add channel at the selected wavelength (note that channel signal  $\lambda_1$  can be added to the system, as it is shown by ADD  $\lambda_1$ ); transmitting the input channels and the add channel through an optical switch matrix (col. 10, lines 7-20, col. 11, lines 42-57 and 1000, fig. 6 and 1203, fig. 9), the optical switch matrix having one or more switches that are capable of redirecting the input channels and the add channel as they pass through the switch matrix (col. 3, lines 13-18, col. 10, lines 15-20); and outputting an output signal by configuring the one or more optical switches of the matrix so that at least one of the input channels is replaced by the at least one add channel at the selected wavelength (col. 7, lines 65-67, col. 8, lines 1-4, col. 10, lines 35-45). As to claim 52, Liu further teaches generating add channels at selectable wavelengths (ADD  $\lambda_1$ , ADD  $\lambda_2$ , fig. 9) and further teaches one of the input channels ( $\lambda_1$ , fig. 9) is redirected away from a corresponding path through the switch matrix and one of the add channels is redirected to that path (col. 7, line 67, col. 8, lines 1-4).

Regarding claims 45 and 54, Liu teaches each input channel has specific wavelengths ( $\lambda_1$ - $\lambda_4$ , fig. 9).

Regarding claims 46 and 55, Liu teaches each input signal is a wavelength multiplexed optical signal (col. 11, lines 45-52 and 1201, 1202, fig. 9).

Regarding claims 47 and 56, Liu teaches multiplexing (MUX, fig. 9) channels to produce a multiplexed signal (col. 13, lines 60-64).

Regarding claims 48 and 57, Liu teaches the optical switch matrix (1203, fig. 9) is a microelectrical mechanical system having an array of micromirrors arranged on a substrate (col. 9, lines 32-40).

Regarding claims 49 and 58, Liu teaches each micromirror is capable of being in a first state for redirecting light passing in close proximity to the micromirror and a second state in which light passing in close proximity to the micromirror is not redirected (col. 8, lines 33-40).

Regarding claim 53, Liu teaches demultiplexing (1202, fig. 9) an input signal to provide input channels (col. 11, line 52).

8. Claim 44, 52, and 81, are rejected under 35 U.S.C. 102(b) as being anticipated by Goldstein et al. (US Patent No: 6,144,781).

Regarding claim 44, 52, and 81, Goldstein teaches a method for adding and dropping channels from an optical transmission medium (col. 2, lines 14-24 and 316, fig. 15), comprising: receiving an input signal having at least two input channels (for example two input channel can be transmitted through trunk lines C1 IN and C2 IN in fig. 15); selecting a wavelength (for example, the optical signal that is transmitted through the port C1 IN from trunk line T3);



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generating an add signal having at least one add channel at the selected wavelength (for example, the optical signal that is transmitted through the port C1 IN from trunk line T3 can be considered as an add signal); transmitting the input channels (for example, the optical signals that are transmitted in trunk T2 through ports B1 IN and B2 IN) and the add channel through an optical switch matrix (col. 8, lines 1-7 and 316, fig. 15), the optical switch matrix having one or more switches (22, fig. 15) that are capable of redirecting the input channels and the add channel as they pass through the switch matrix (col. 8, lines 8-22); and outputting an output signal by configuring the one or more optical switches of the matrix so that at least one of the input channels is replaced by the at least one add channel at the selected wavelength (for example, when reflecting element 22 is in a reflecting state, the light coming from line B1 IN gets reflected by the element 22 and outputted to port C2 OUT, and an added light coming from line C2 IN gets reflected by element 22 and outputted to port B1 OUT). As to claim 81, Goldstein teaches input ports for launch a plurality of input channels (for example the ports B1 IN and B2 IN of trunk line T2), output ports (B1 OUT and B2 OUT), add ports (C1 IN and C2 IN), and drop ports (C1 OUT and C2 OUT).

9. Claim 82-83 are rejected under 35 U.S.C. 102(b) as being anticipated by Jungerman et al. (US Patent No: 5,841,917).

Regarding claims 82-83, Jungerman teaches an apparatus (50, fig. 4), comprising: a first optical switch array (the first top switch array 10 in the left side of switch 50) and a second optical switch array (the top switch array 10 of the right side in switch 50), an input port (the I/O ports on the left hand side) adapted to launch a plurality of input channels at respective ones of a

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plurality of wavelengths into the first switch array (col. 5, line 45), the input port and the first switch array being such that each of the input channels can pass through the first switch array to the second switch array (col. 5, lines 40-48), the first switch array being operable to divert any of the input channels away from the second switch array (col. 3, lines 15-28), an output port (the I/O ports at the right side of the switch array 50), wherein the output port and the second switch array being such that each of the input channels passed to the second switch array can pass through the second switch array to the output port (for example, when the reflective surfaces 20 are not in the path of optical beams, the optical beam passing through the first switch array can reach the output ports that are connected to the second switch), and an add port (the I/O ports at the top of the second switch array) adapted to launch add channels into the second optical switch array (note that optical signals can be added by the I/O ports at the top of the second switch array), the add port and the second optical switch array being such that any of the add channels can be directed to the output port at any of the wavelengths (for example, when the added signal through the I/O ports at the top, are reflected by the corresponding reflective surfaces 20 of the second switch, are routed to the I/O ports attached to the right side of the switch).

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 61, 67-68, and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (US Patent No: 5,581,643) in view of Duguay (US Patent No: 5,671,304).

Regarding claims 61, 67, and 80, as it is understood in view of the above 112 problem, Wu teaches an optical switching system (fig. 13) that is comprised of a plurality of input channels ( $\lambda_1, \lambda_2$ , fig. 13) that are directed to optical switches (the mirrors in fig. 13) and a controller that configures the optical switches (col. 4, lines 10-35) to selectively add one or more additional channels ( $\lambda_9, \lambda_{10}, \lambda_{11}$ , fig. 13) to the optical signal. Wu differs from the claimed invention in that Wu does not specifically disclose one or more tunable light sources for providing the one or more additional channels. Duguay teaches a two dimensional optoelectronic tune-switch (fig. 2) which uses tunable lasers and diffractive optical elements to switch a matrix of input/output channels (see abstract). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate tunable lasers such as the ones of Duguay, for generating the added or the additional signals of wavelengths  $\lambda_9$ – $\lambda_{16}$ , in the optical switching system of Wu in order to selectively emit lights of different wavelengths. As to claims 67 and 80, Wu teaches input ports (col. 9, line 62), output ports (col. 9, line 63), add ports (col. 9, line 64) and drop ports (col. 9, line 66) that are coupled to the optical switch matrix.

Regarding claim 68, Wu teaches a first and a second array of switches (for example, when the 16x16 switch array shown in fig. 13 is divided into two 8x8 array of switches).

12. Claim 61 and 63-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US Patent No: 6,519,060) in view of Duguay (US Patent No: 5,671,304).

Regarding claim 61, Liu teaches an optical switching system (fig. 9) that is comprised of a plurality of input channels ( $\lambda_1$ – $\lambda_4$ , fig. 9) that are directed to optical switches (1203, fig. 9) and a controller that configures the optical switches (col. 8, lines 34-37, col. 9, lines 32-40) to

selectively add one or more additional channels (ADD  $\lambda_1$ , ADD  $\lambda_2$ , fig. 9) to the optical signal.

Liu differs from the claimed invention in that Liu does not specifically disclose one or more tunable light sources for providing the one or more additional channels. Duguay teaches a two dimensional optoelectronic tune-switch (fig. 2) which uses tunable lasers and diffractive optical elements to switch a matrix of input/output channels (see abstract). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate tunable lasers such as the ones of Duguay, for generating the added or the additional signals of wavelengths ADD  $\lambda_1$ , or ADD  $\lambda_2$ , or ADD  $\lambda_3$  in the optical switching system of Liu in order to selectively emit lights of different wavelengths.

Regarding claim 63, Liu teaches a demultiplexer (1202, fig. 9) that demultiplexes the input optical signals ( $\lambda_1$ - $\lambda_4$ , fig. 9).

Regarding claim 64, Liu teaches each channel has a specific wavelengths (col. 11, lines 48-52).

Regarding claim 65, Liu teaches the input optical signal is a WDM signal (col. 11, line 52).

Regarding claim 66, Liu teaches a multiplexer (MUX, fig. 9) that multiplexes the input channels and the added channels (ADD  $\lambda_1$ , ADD  $\lambda_2$ , fig. 9).

13. Claim 61, 67, and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldstein et al. (US Patent No: 6,144,781) in view of Duguay (US Patent No: 5,671,304).

Regarding claims 61, 67, and 80, as it is understood in view of the above 112 problem, Goldstein teaches an optical switching system (fig. 15) that is comprised of a plurality of input channels that are directed to optical switches (the input channels that enter the optical matrix crossconnect 316) and a controller that configures (col. 8, lines 22-25) the optical switches (22, fig. 15) to selectively add one or more additional channels (the additional channels that enter through ports C1 IN, C2 IN, C3 IN, and C4 IN) to the optical signal. Goldstein differs from the claimed invention in that Goldstein does not specifically disclose one or more tunable light sources for providing the one or more additional channels. Duguay teaches a two dimensional optoelectronic tune-switch (fig. 2) which uses tunable lasers and diffractive optical elements to switch a matrix of input/output channels (see abstract). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate tunable lasers such as the ones of Duguay, for generating added or additional signals, in the optical switching system of Goldstein in order to selectively emit lights of different wavelengths.

14. Claims 69-74 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. Claims 84 and 86 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (703) 308-9063.

The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**M. R. SEDIGHIAN**  
**PRIMARY EXAMINER**